

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

Original claims 1-26 and amended claims 19 and 23-28 are cancelled.

Claim 29 (new): A flame-resistant aminoplast resin system, comprising:

a) a modified aminoplast resin matrix having primary aminoplast condensates present at least partly in etherified form in the modified aminoplast resin, wherein the modified aminoplast resin is obtained from a substantially solvent-free aminoplast resin melt, and

b) at least one compound which contains at least one of phosphorus, nitrogen or boron in chemically bonded form and is present in encapsulated form and enclosed by a capsule wall material in the aminoplast resin matrix as a flame-retardant component, wherein the resin system produced is a melamine-formaldehyde resin system, a melamine/urea-formaldehyde resin system, or a formaldehyde resin system.

Claim 30 (new): The aminoplast resin system as claimed in claim 29, wherein the aminoplast resin is etherified with C₁-C₄-alcohols.

Claim 31 (new): The aminoplast resin system as claimed in claim 29, wherein the modified aminoplast resin contains at least one of transesterification agents, modifiers, fillers, reinforcing fibers, further polymers, stabilizers, UV absorbers, or auxiliaries.

Claim 32 (new): The aminoplast resin system as claimed in claim 31, wherein the transesterification agents used are at least one of aliphatic C₄-C₁₈-alcohols, aromatic alcohols, diols, polyols or mixtures thereof.

Claim 33 (new): The aminoplast resin system as claimed in claim 29, wherein the at least one compound present in encapsulated form contains ammonium polyphosphate, melamine polyphosphate, phosphoric acid ester and phosphonic acid ester based on the reaction of phosphorus pentoxide or phosphorus trioxide with pentaerythritol or dipentaerythritol, and ammonium and melamine salts thereof.

Claim 34 (new): The aminoplast resin system as claimed in claim 29, wherein the at least one compound present in encapsulated form also has a proton-liberating effect in addition to the flame-retardant effect.

Claim 35 (new): The aminoplast resin system as claimed in claim 29, wherein the system contains a plurality of different compounds present in encapsulated form.

Claim 36 (new): The aminoplast resin system as claimed in claim 29, wherein the capsule wall material comprises a thermosetting resin selected from the group consisting of an aminoplast resin, an epoxy resin, an unsaturated polyester resin, and a phenol resin.

Claim 37 (new): The aminoplast resin system as claimed in claim 36, wherein the capsule wall material comprises a modified aminoplast resin which has surface properties similar to the modified aminoplast resin forming the modified aminoplast resin matrix.

Claim 38 (new): The aminoplast resin system as claimed in claim 29, wherein the at least one compound present in encapsulated form is present in homogeneously distributed form in the aminoplast resin matrix.

Claim 39 (new): The aminoplast resin system as claimed in claim 29, wherein the ratio of diameter to capsule wall thickness of the capsules is from 5 to 1000.

Claim 40 (new): The aminoplast resin system as claimed in claim 29, wherein the average diameter D of the capsules is in the range of 1-100 μm , such as 10-60 μm or 20-50 μm .

Claim 41 (new): The aminoplast resin system as claimed in claim 29, wherein the geometrical shape of the capsules is spherical.

Claim 42 (new): The aminoplast resin system as claimed in claim 29, wherein the amount of at least one compound present in encapsulated form is from 0.5 to 50% by weight, such as from 1 to 40% by weight or from 5 to 25% by weight, based on the total weight of the cured aminoplast resin system.

Claim 43 (new): The aminoplast resin system as claimed in claim 29, wherein the amount of at least one compound present in the capsules is from 50 to 98% by weight, such as from 70 to 90% by weight, based on the total weight of a compound present in encapsulated form.

Claim 44 (new): The aminoplast resin system as claimed in claim 29, wherein the at least one compound present in encapsulated form is added to the modified aminoplast resin as powder or as suspension or both.

Claim 45 (new): The aminoplast resin system as claimed in claim 44, wherein the substantially solvent-free aminoplast resin melt or at least a part of the transesterification agents or modifiers used for modifying the aminoplast resin are used as suspending agents.

Claim 46 (new): The aminoplast resin system as claimed in claim 44, wherein the solids content of the suspension is from 30 to 90% by weight, such as from 40 to 80% by weight, and the viscosity is from 10 to 5000 mPa.s, such as from 250 to 1000 mPa.s.

Claim 47 (new): A process for the preparation of a flame-resistant aminoplast resin system, comprising the steps of:

- a) preparing a modified aminoplast resin solution or aminoplast resin suspension from an aminoplast former, a carbonyl compound and a C₁-C₄-alcohol at a pH = 2 to 7, a temperature of from 40 to 160°C, a pressure of from 0 to 5 bar and a reaction time of from 5 to 300 minutes,
- b) concentrating the modified aminoplast resin solution or aminoplast resin suspension after the pH has been made alkaline by distilling off the solvent at from 50 to 180°C and from -1 to 0 bar and in a residence time of from 1 to 120 minutes to give a substantially solvent-free aminoplast resin melt,
- c) reacting the substantially solvent-free aminoplast resin melt at a temperature of from 130 to 250°C and from -1 to 0 bar and in a residence time of from 0.5 to 10 minutes in an extruder or kneader for pre-condensation and conditioning,
- d) adding at least one compound enclosed by a capsule wall material during or after at least one of steps a), b), or c), whereupon
- e) the flame-resistant aminoplast resin system is compounded and discharged.

Claim 48 (new): The process as claimed in claim 47, wherein at least one of transesterification agents or modifiers are added to the modified aminoplast resin during or after at least one of steps a), b), or c).

Claim 49 (new): The process as claimed in claim 48, wherein the addition of at least one compound present in encapsulated form in the form of a suspension in the transesterification agents or modifiers or both is effected during the reactive conversion in an extruder.

Claim 50 (new): The process as claimed in claim 47, wherein the reactive conversion is carried out in two extruders connected in series.

Claim 51 (new): The preparation of hybrid resin systems having a flame-resistant aminoplast resin system as claimed in claim 29, comprising the step of mixing or chemical reaction or both the flame-resistant aminoplast resin systems with at least one of modified or unmodified melamine-formaldehyde resins, epoxy resins, polyurethane resins, unsaturated polyester resins or alkyd resins as melts in a kneader, mixer or extruder.

Claim 52 (new): The preparation of hybrid resin systems having a flame-resistant aminoplast resin system as claimed in claim 29, wherein the resin is in the form of granules or powder or both as compression molding resin or as injection molding resin.

Claim 53 (new): The preparation of hybrid resin systems having a flame-resistant aminoplast resin system as claimed in claim 29 for the production of a composite material, wherein a substrate material is coated with the flame-resistant aminoplast resin system in powder form or the aminoplast resin system is melted and the substrate material is drawn through the resin melt or both, whereupon a pre-condensation step in the range of about 110-250°C for a duration of about 1-10 minutes is effected, whereupon the storable prepreg obtained is subjected to shaping with a temperature increase and is cured thereby.

Claim 54 (new): The preparation of hybrid resin systems having a flame-resistant aminoplast resin system as claimed in claim 29, wherein the resin is used for pipes, sheets, profiles, injection molded parts or fibers, as a curing agent or crosslinking agent in powder coating systems or for the production of flame-resistant shaped articles.

Claim 55 (new): A composite material having a substrate material coated with a flame-resistant aminoplast resin system as claimed in claim 29, wherein the resin is a coating in powder form or the aminoplast resin system is melted and the substrate material is drawn through the resin melt, whereupon a pre-condensation step in the range of about 110-250°C for a duration of about 1-10 minutes is effected, whereupon the storable prepreg obtained is subjected to shaping with a temperature increase and is cured thereby.

Claim 56 (new): The composite material as claimed in claim 55, wherein the shaping and curing are effected by a pressing process in an acidic pH range of pH 3-pH 6.5 at from 90 to 250°C and from 10 to 250 bar compression pressure and for a duration of from 0.5 to 30 minutes.